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MACRO-ECONOMIC UNCERTAINITY, FINANCIAL DEVELOPMENT AND ECONOMIC GROWTH IN ZIMBABWE

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MACROECONOMIC UNCERTAINTY, FINANCIAL DEVELOPMENT AND ECONOMIC GROWTH IN ZIMBABWE

By

K. Mlambo and A. B. Elhiraika

1. Introduction

Zimbabwe has one of the most well-diversified economic structures in Sub-Saharan Africa with a relatively sophisticated financial and capital market. Yet over the last two decades and a half, the country has experienced low and variable real GDP growth rates. In 1982-89 Zimbabwe recorded a negative average real GDP per capita growth rate of -0.2 percent, which fell further to an annual average rate of -3.2 percent in 1990-95. In addition, the country faces growing macroeconomic uncertainty mainly due to high public deficits and high inflation. Inflation, which is an indicator of macroeconomic uncertainty increased from an average of 13.7 percent in 1982-89 to 26.2 percent in 1990-95, while government budget deficit averaged over 9 percent of GDP between 1980 and 1995. Thus, as in other developing countries, macroeconomic stability and liberalisation are prerequisites for economic recovery and sustainable growth in Zimbabwe.

In recent years, economic literature has focussed on the role of financial development on economic growth following the influential work of McKinnon (1973) and Shaw (1973). Financial development is said to positively affect real growth by raising the volume of investment (Goldsmith, 1969, and Bencivenga and Smith, 1991); by improving the volume and structure of savings (e.g. Fry, 1988, Warman and Thirlwall, 1994); and by improving the efficiency of investment through project selection, innovations and entrepreneurship growth (Greenwood and Jovanovic, 1990, and King and Levine, 1993). Financial development is also hypothesised to boost the growth of entrepreneurial talents, and capital formation. That is, financial institutions do not only channel investible resources, but by specialising in lending activities, they can also give valuable financial guidance and technical assistance to borrowers (Furness, 1975). Moreover, financial intermediaries may also initiate investment projects on their own and thereby foster the process of financial and economic innovations that ultimately raise the rate of economic growth.

However, the voluminous empirical work on financial liberalisation and growth produced mixed results (see Gibson and Tsakalotos, 1994), though a positive link between financial development and economic growth seems to be widely accepted (see Gregorio and Guidotti, 1995). For example, King and Levine (1993) studied 80 countries over the period 1960-1989 and concluded that by choosing higher quality entrepreneurs and projects, providing superior vehicles for diversifying the risk of innovative activities, and revealing more accurately the potentially large profits associated with the uncertain business of innovations, financial development fosters productivity improvement. Gregorio and Guidotti (1995), in a cross-country data for a sample of 98 countries for the period 1960-85, and a panel data set for 12 Latin American countries for 1950-85, found that though financial development leads to improved growth performance, its growth impact varies across countries and over time. And in the case of Latin American countries it was found to be negative during the 1970s and 1980s period, and this was attributed to financial liberalisation in a poor regulatory environment. The channel of transmission was said to be the efficiency rather than volume of investment, which was tested by regressing the growth equation with both investment and credit variables and then dropping the former to see how the latter, which embodies efficiency features, behaves. This argument received support from the evidence provided by Demirguc-Kunt and Levine (1996).

This paper tries to examine the link between financial development and economic growth in Zimbabwe using a macroeconomic model. We specify, estimate and analyse the relation between macroeconomic uncertainty, policy credibility and financial development on the one hand and expenditure variables on the other. Measures of macroeconomic uncertainty and policy credibility are specified following Mlambo and Mhlope (1997). The relevant measures of financial development are specified following King and Levine (1993), Demirguc-Kunt and Levine (1996), and Gregorio and Guidotti (1995). These have been broken down into sub-periods to provide a useful basis for assessing the outcome of the recent financial and economic reforms, even though they are not included in the structural equations themselves. In particular since the reform programme was only introduced in 1990, the sub-period measures allow us to analyse how financial sector development and real development have behaved during the reform era.

The paper is divided into five sections. The next section examines the macroeconomic background and performance covering the stage of financial development and real growth as well as related policy issues. Section 3 specifies the macroeconomic model to be estimated, while section 4 presents the regression results and their interpretation. Section 5 offers some concluding observations and policies.

2. Financial development and economic growth

In this section we shall first discuss the evolution of financial market policies in Zimbabwe, concentrating mainly on the institutional structure besides interest rate and credit policy. Next we examine the indicators of financial development, and macroeconomic performance and stability.

2.1 Structure of the Financial Sector

To start with we consider the structure of the financial system and the level of financial development. Zimbabwe operates a relatively well-developed and competitive banking system that employs modern banking and financial practices. An important feature of the banking system in Zimbabwe is its ologoplistic structure. Zimbabwe has 5 commercial banks, namely, Standard Chartered, Barclays Bank, Zimbank, Stanbic (formerly Grindlays) and Commercial Bank of Zimbabwe, with about 150 branches country-wide. There are six merchant banks, three discount houses, and eight commercial houses. There are also three development banking institutions, the largest being the Zimbabwe Development Bank, in which government has a 51% shareholding. Zimbabwe also has several pension funds, such as the Mining Pension Fund, the Local Authorities Pensions Fund, and the recently created National Social Security Authority (NASSA). There are also several insurance companies who dominate the non-bank financial system. The Zimbabwe Stock Exchange (ZSE) has 64 listed companies and has a market capitalisation of Z$20 billion or 36% of the country's GDP. An important feature of the financial system in Zimbabwe is the significant role of the state in banking, with majority holding in ZIMBANK and 20% in the Commercial bank of Zimbabwe (CBZ).

The financial sector had been regulated in the past, where the monetary authorities made use of

interest rate and credit ceilings to control and direct spending. Liberalisation of interest rates was undertaken in 1991 as part of an overall economic reform programme and all forms of financial controls were removed by 1992. The relevant outcomes of these efforts are discussed below.

2.2 Indicators of Financial Development

Table 1 shows the indicators of financial development in Zimbabwe for the pre-reform sub-periods 1981-1985 and 1986-1990, the post reform sub-period 1991-1995, as well as the whole period 1981-1995. In terms of M3-GDP ratio, the Zimbabwean financial system is reasonably developed. Also Zimbabwe has a relatively large non-bank financial sector with an NBFIA-GDP ratio of 0.23. As Figure 1 demonstrates, Zimbabwe appears to have a sophisticated financial system in terms of depth, size of the banking sector, structure of liabilities and assets, lending to the private sector and mobilisation of longer term savings.

Interest rate liberalisation lies at the heart of financial reform programmes and constitutes an important tool of monetary policy. Zimbabwe followed a repressed financial regime before the initiation of financial sector reforms. For most of the period between 1980 and 1993 both real deposit and lending rates in Zimbabwe were generally negative, but the lending rate was far above the deposit rate. A widening spread between deposit and lending rates may discourage savings and investment. Banking efficiency, as reflected in the interest rate spread, seems to be weak in Zimbabwe (see Figure 3). The average spread was 6.32 in 1981-1995. However, compared with the 1980s, the spread has widened, especially after 1993, and this may be resulting from the fact that monopoly banks are exploiting the opportunities provided by the liberalisation of the interest rate.

Unlike the situation in many developing countries, even before the reform phase, credit allocation in Zimbabwe was weakly controlled by the state. On the eve of the introduction of the reform programme, credit to the public sector, which includes central government and non-financial public enterprises accounted for 83% of total credit, but its share declined in the late 1980s and 1990s, accounting for 30% of total credit between 1991 and 1995 (Table 2). A substantial amount of credit, especially in the mid-1980s was directed to parastatals.

Credit controls have temporary effect on the lending policies of the banks, and actually diminish competition between them. In general the ceilings set by the monetary authorities do not consider the specialisation of the banks and the risks involved. In general there is no evidence that in the 1980s there was an increase in the flow of credit to priority sectors such as agriculture. One possible reason for the reluctance by banks to lend to the priority sectors could have been because of the lack of incentives to accompany the ceilings. Given the high risk in some of the priority sectors like rain-fed agriculture and lack of collateral, credit policy has tended to suffer from adverse selection and moral hazard problems. Moreover, they have prevented banks from entering new fields of credit expansion.

Reserve asset requirement compel banks to hold a certain proportion of their deposits with the central bank. Although their purpose is to ensure liquidity in the banking system, the fact that they earn little interest makes them costly to banks. It is therefore a form of seigniorage extraction. In Zimbabwe the required reserves ratio was generally low ranging between 5% and 10% between 1981-1995. In developed countries the reserve requirement rate is between 2 and 3%, and in South-East Asia it is about 8%. High reserves in some developing countries are indicative of weak financial development in terms of illiquid inter-bank markets, costly intermediation, and shortage of credible borrowers.

2.3 Macroeconomic Performance, Stability and Reforms

Overall macroeconomic stability is crucial for the success of financial sector reforms, and the link between financial development and economic growth. One of the reasons given for the success of reform programmes in some sub-Saharan African countries is the sequential way it was introduced (see Soyibo, 1994). In Zimbabwe financial reforms were introduced together with other reforms, though the financial sector seemed to respond quicker compared with the real sector. Other countries, such as Ghana for example, began with an overall macroeconomic reform programme, and gradually moved to financial sector reform. Countries that have taken the other way as in Zimbabwe, trying to liberalise the financial sector in the face of macroeconomic instability have suffered from destabilising capital flows and high interest rates. In addition, financial liberalisation was of accompanied by an improvement in the institutional and regulatory framework. In general bank supervision and oversight by the central bank has

remained weak, and has contributed to greater insecurity in the financial system, especially after the collapse of one of the merchant banks in 1998. There is clearly a need to improve supervision regulation and legal foundations in order to strengthen the financial system in Zimbabwe.

In Table 2 we have compiled selected indicators of macroeconomic performance and stability for Zimbabwe. The table shows that average real GDP growth rate declined from 4.62% in 1986-90 to 1% over the period 1991-95. An important component of the reform programmes with implications for the success of financial sector reforms is fiscal reform. As a ratio of GDP, Government deficit (GDEF) declined only from -9.69% in 1986-1990 to -8.25% in 1991-95. Lack of fiscal adjustment has thus been the main problem in its Zimbabwe's relations with the IMF and the World Bank, leading to a suspension of policy-lending programmes. Fiscal consolidation and reforms include reducing the size of the civil service, improving the revenue collection process and privatisation of some public enterprises. Fiscal reforms appear to have been the most difficult to implement.

Inflation rate and the rate of TOT growth suggest a high degree of instability in Zimbabwe; both rates were high and fluctuating averaging 18.53% and 8.54% respectively. At the same time the real private investment rate which averaging 20.04% of GDP between 1981-1995 failed to raise the private saving rate which was generally declining over the same period. As a result the rate of real per capita GDP growth was also negative for many years, averaging 0.215% during the period 1981-1995 (Table 2). Also, Figure 3, shows that the nominal deposit rate has been increasing but the real rate continued to be negative (or moderately positive).

3. Specification of the Model

Macroeconomic models have been intensively used to study macroeconomic issues in developing countries. However, it has been noted that these models lack consensus on the appropriate analytical framework. Accordingly, Haque et. al (1990) complain that individual models suitable for different tasks have proliferated with different, and often conflicting assumptions about a wide range of crucial aspects of these economies. Further, they point out that at the empirical level, this lack of consensus on analytical macroeconomic models for

developing countries is even more profound. There are significant disagreements over the general specification and of such models, as well as the order of magnitude of certain key macroeconomic parameters.

Haque et. al (1993) employ a representative developing country model using a uniform cross-country data for a large sample of countries, to estimate certain key macroeconomic parameters. The question that arises from these and other similar macroeconomic estimates, is whether the estimated parameters would hold when it comes to individual country's experience. On the basis of commonly applied developing country specifications, this study develops a simple structural macroeconomic model of key behavioural relationships.

The model assumes market-clearing conditions and attempts to capture the major structural characteristics of Zimbabwe as a country with a relatively well developed financial sector. The objective of the model is to identify the impact of financial variables on income/expenditure variables. On the demand side, equilibrium is ensured by equality between national saving and investment, given flexible output prices. The model incorporates the effect of variables such as uncertainty emanating from macroeconomic instability that are not normally taken into consideration in macroeconomic models for developing countries. Unless otherwise indicated all variables are measured at constant prices. Real variables are obtained by deflating each nominal variable by the appropriate price index such as the GDP deflator and the consumer price index. The model consists of the following blocks:

3.1 The commodity market

Aggregate demand components include private consumption expenditure, private investment expenditure, import demand and government expenditure. Private saving and investment functions are often specified (see Elbadawi and Schemidt-Hebbel, 1994) with total public expenditure assumed to be exogenous.

3.1.1 Private saving

The recent literature private on saving/consumption behaviour has focused on permanent-

income hypothesis (PIH) and life-cycle hypothesis (LCH). Unlike the absolute income hypothesis that postulates consumption as a function of current income, the PIH distinguishes between permanent and transitory income. While the latter is mostly saved the former is the main determinant of private consumption i.e. saving is determined by unexpected future income gains. It is assumed that consumers are homogeneous and that each agent is closely linked to future generations. Hence permanent income, determined with reference to an infinite sequence of finitely-lived generations linked through inter-generational transfers, is measured as the discounted net value of income from all human and non-human sources of these sources of income (Schmidt-Hebbel et. al, 1996).

According to LCH households save in order to smooth lifetime consumption. In addition to economic variables such as income and the rate of interest demographic characteristics including age, education and household size also influence private consumption and saving. A typical household saves less at early adult age, saves most at mid-life and dissaves during retirement. Hence the motive to save is driven by retirement requirements and constrained by lifetime resources, namely income growth, and population age structure. In the PIH and LCH saving as a means of smoothing life-time consumption are subject to two major constraints viz. the disposable income constraint, and the borrowing constraint that determines the ability of the household to dissave.

Our specification of the private saving function draws on Mwega (1997), and Hadjimachael and Ghura (1995). The various determinants of household saving behaviour are:

(i) The rate of interest: theoretically, the net effect of the rate of interest on aggregate savings is ambiguous as it depends on the income and substitution effects that operate in opposite directions. Financial intermediation especially under conditions of perfect financial markets can ease the liquidity constraints of households and business firms, lower uncertainty concerning future income and hence reduce aggregate savings. It is nonetheless argued that positive real interest rates can at least influence the form in which saving is held in a developing country; financial intermediation increases the ratio of financial savings and hence stimulate economic growth through increased availability of loanable funds (McKinnon, 1973 and Shaw, 1973). However, empirical evidence from a number of Sub-Saharan African counties indicates that

"financial liberalisation and interest rate deregulation often as part of structural adjustment programmes have had very little effect on improving the size and allocation of saving" (Schmidt-Hebbel et. al, 1996). The same conclusion was reached with respect to a number of Latin American countries (see e.g. Warman and Thirlwall 1994).

(ii) Liquidity and borrowing constraints: The extent to which a household can consume in excess of current income depends on its ability to borrow. The willingness of financial institutions to provide consumption loans is influenced by uncertainty of future income or risk of moral hazard from default behaviour on the part of borrowers. An ease of borrowing constraints raises present consumption and lowers savings (Mwega, 1997). There are two indicators of borrowing constraints that can easily be tested in the case of a developing country. These are the beginning of period money balance as suggested by Schemidt-Hebbel et. al (1992) and the ratio of bank credit to the private sector to total domestic credit. Mwega's (1997) cross-section confirms Schemidt-Hebbel et. al (1992) finding of a positive relation between M2/GDP ratio and savings, but he found credit availability to have a negative effect.

(iii) Life-cycle/demographic variables: The basic indicator of the LC stage of the population is its age composition. The youth and elderly are expected to have lower income and savings, but consumption is assumed to be fairly stable or slightly increasing over time with income. Rapid population growth is hypothesised to increase the youth and may adversely affect savings unless offset by an increase in income or a decrease in consumption by the working population (Mwega, 1997). Another LC variable is the dependency ratio that is expected to also adversely affect savings. However this may not hold if the motive for saving to finance retirement is not strong or the bequest motive is strong so that saving by the elderly actually increase.

(iv) Terms of trade: Growth in a country's terms of trade (TOT) may have an important effect on private savings depending on whether these changes are viewed as permanent or transitory. A temporary shock to TOT affects windfall income and hence savings, while a permanent TOT shock may have no important impact (see Hadjimaichael and Ghura, 1995).

(v) Economic Growth: On the premise of the LCH the effect of income growth on aggregate saving is ambiguous as it depends on the distribution of such income growth among different

age groups. Aggregate savings increase only when the incomes of younger generations grow faster compared with those of the older. In general empirical evidence points out that income growth leads to more saving, and that although there is a two way causation between the two it is growth that mainly determines savings (see Hadjimichael and Ghura, 1995, and Mwega, 1997). Econometric estimates by Mwega (1997) show a strong positive parameters of per capita income growth on savings in a sample of 33 developing countries.

(vi) Fiscal policy: It is well-known theoretically that the effect of fiscal deficits (public savings) on private savings depends on the assumptions made; it has no effect in the neo-classical model, some effects in the Keynesian model and a full crowding-out under the Ricardian equivalence. The public deficit is a measure of the public sector's borrowing requirements (PSBR) and its impact depends critically on how the deficit is financed. While a money-financed deficit may be inflationary, a deficit financed by borrowing from private domestic sources is likely to crowd-out private investment through reduced credit availability or high real interest rates or both. Furthermore, even when the deficit is externally financed it may affect the private sector via exchange rate appreciation. The effects of fiscal adjustment, a major component of structural adjustment programmes, on private saving and investment hinges on how the public deficit is corrected. Tax increases have an unambiguous negative impact on private saving.

If the private sector is rational and forward looking to the extent of incorporating the inter-temporal effects of the public budget in its saving and investment decisions, lower public spending and high public savings will be exactly offset by a decline in private saving (the Ricardian equivalence theory - see Barro 1974). The opposite would be true if high public savings give rise to high expected tax rates. The effect of public saving on private saving therefore remains ambiguous especially in developing countries where "capital markets are generally imperfect, and the future course of fiscal policy is difficult to predict" (Hadjimichael and Ghura 1995). Meanwhile empirical work provides mixed results (see Schmidt-Hebbel et. al, 1996).

Other fiscal policy variables that may affect private saving include company tax. However, due to data limitations available evidence does not test the importance of this variable.

(vii) Macroeconomic stability: The impact of macroeconomic instability and resulting uncertainty on private sector activities has been the thrust of recent economic research in developing countries. The significance of macroeconomic stability is that it "sends important signals to the private sector about the direction of economic policies and the credibility of the authorities' commitment to manage the economy efficiently. Such stability, by facilitating long-term planning and investment decisions, encourages savings and capital accumulation by the private sector" (Hadjimichael and Ghura 1995). Several proxies for macroeconomic instability exist in the literature (see Hadjimichael and Ghura, 1997). However, as Mwega (1997) argues inflation is a good proxy in the case of sub-Saharan Africa; the inflation rate in these countries is highly correlated with the size of fiscal deficit and growth in money supply. Meanwhile a high rate of inflation[1] indicates lack of credibility in government policy, and may affect saving and investment through changes in the rate of interest (real or nominal). Other proxies for macroeconomic instability includes changes in terms of trade, fiscal deficit and the ratio of public-debt to GDP (see the discussion under private investment).

(viii) Other open economy dimensions: Foreign savings, or the current account deficit as a ratio of GDP, may have a rather ambiguous effect on domestic savings (Thirlwall, 1983:298). This means that the effect of foreign savings on private saving may be complimentary, adverse or neutral. "Other open economy variables such as the degree of openness and the variability of the real exchange rate have generally been found insignificant " (see Hadjimichael and Ghura, 1995). The specification[2] of the private saving function, which is estimated in the next section, is as follows:

PSY = f(DEPEND, POPgr, TOTgr, GSY, RDR, BMGDP, PSCGDP, INFL, GSYSD, INFLSD, CAGDP, PSYt-1) (1)

Where:
PSY = private saving-GDP ratio
POPgr = population growth rate (+ve/-ve)

[1] As noted by Hadjimichael and Ghura (1995) and Mwega (1997) inflation is also likely to be highly correlated with other proxies such as variability of inflation and the size of the exchange rate premium which largely provides the same information.

[2] Due to data constraints some possible regressors as the dependency ratio are dropped. Some potential uncertainty variables are also dropped because for the purpose of having a more parsimonious model, given the length of our sample.

TOTgr = terms of trade growth rate (+ve)
GSY = public savings as a ratio of GDP (-ve)
RDR = real deposit rate of interest ((+ve/-ve)
BMGDP = broad money-GDP ratio (+ve)
PSCGDP = private sector credit as a ratio of GDP (+ve)
INFL = inflation rate (-ve)
CAGDP = current account deficit/surplus-GDP ratio (+ve/-ve)
PSYt-1 = lagged dependent variable (+ve)
GSYSD = standard deviation of GDEFGDP (-ve)
INFLSD = standard deviation of inflation (-ve)

Consumer disposable income is defined as:

$$Y^d = Y_t + [(i^*.ER_t.F_{p,t-1}) - (i.DC_{p,t-1})]/Pt - TAX \quad (2)$$

Where i=nominal domestic interest rate; i*= nominal foreign rate of interest. ER = nominal exchange rate defined as the domestic currency value of foreign currency; F_p = stock of real foreign assets[3] held by the private sector; P = domestic price level; TAX = total real tax revenue (net of transfers); and DC_p = stock of domestic bank credit to the private sector. The first term within brackets gives interest income from domestic assets, while the second one gives interest income from assets denominated in foreign currency. Consumer disposable income is linked to net changes in consumer financial wealth by the private sector budget constraint:

$$Y^d = PC_t + PI_t + (\Delta M + \Delta Fp - \Delta DC_p)/Pt \quad (3)$$

Where money balances are broadly defined as M_2 and PI is real private investment. This identity signifies that real disposable income is either consumed, invested or saved in the form of financial assets.

3.1.2 Real private investment

According to Bleaney (1994), private investment models generally fall into three categories: the neo-classical model, the accelerator model, and Tobin's Q model. The former model which identifies both accelerator and cost of capital effects has been the most widely used one (see e.g.

[3] Measured (held) in foreign currency units and deflated by domestic price index.

Serven and Solimano 1993). The accelerator theory assumes a lagged adjustment of capital to its desired level (K^*_t) so that:

$$\Delta K_t = PI_t = \alpha(K^*_t - K_{t-1}) \quad (4)$$

Where K_t=stock of capital in the current period; K_{t-1}=capital stock lagged by one period. The desired capital stock is determined by the long-run equilibrium condition that the value of the marginal product of capital has to be equated to the marginal cost of capital. This condition is transformed such that K^* depends on expected profits, which in turn depend on prices, output and other autonomous shocks. Thus empirical models of private investment have focused on the price and autonomous shock variables that affect expected profits and thereby the level of private investment.

The specification of the private investment regression equation draws heavily on Mlambo and Mhlope (1997) model in which the ratio of private investment to GDP was regressed on standard Keynesian and neo-classical variables, public investment, liquidity constraints, and uncertainty variables, i.e.:

$$PIY = f(GDPGR, UCK, GIY, BMGDP, PSCGDP, FCIGDP, CU, INFL, RWRGR, INFLSD, RERGRSD, TOTGRSD, PIYt\text{-}1, TOTGR, RERGR, PIYt\text{-}1) \quad (5)$$

where :
PIY= ratio of private investment to GDP
GDPGR = rate of growth of GDP (+ve)
UCK = user cost of capital (-ve)
BMGDP = ratio of broad money to GDP (+ve)
RERGR = rate of change in real exchange rate (+ve/-ve)
TOTGR = terms of trade growth rate (+ve)
FCIY = net foreign capital inflow-GDP ratio (+ve)
CU = capacity utilisation (+ve)
RWR = real wage rate (-ve)
INFLSD, RERGRSD, TOTGRSD and FCISD = standard deviations of INFL, RER, TOT and FCI respectively.

The standard deviations of the variables are used to pro and refer to indices[4] of macroeconomic uncertainty and policy credibility. All these price and output uncertainty variables are expected

[4] See Mlambo and Mhlope (1997) for detailed discussion of such indices.

to have negative effects on private investment, a possibility that was confirmed by Mlambo and Mhlope (1997). Given the length of our data only statistically significant indicators are retained in our adopted empirical investment equation. Moreover, a human development variable was dropped from the equation due to data constraints. The UCK variable is computed as:

$$UCK = (Pi/GDPDEF)(i+\delta-\pi i) \quad (6)$$

where δ refers to the rate of depreciation, assumed to be 5%, πi is the expected inflation of investment goods, GDPDEF is the GDP deflator, and Pi is the price of investment goods.

3.1.3 Import Demand

We specify a standard import demand function in which the level of real income and the ratio of import prices to domestic prices are the major independent variables:

$$(IM/P)t = f(Y, RER, CTI, \Delta RPSCt, (IM/P)_{t-1}) \quad (7)$$

Where IM is the domestic currency value of imports, RER is real rate of exchange. Similar to Haque et. al (1993) the ratio of foreign exchange reserves to the foreign currency value of imports ($RES_{t-1}.ER/IM_{t-1}$) is included, in addition to real income, as a measure of the capacity of the country to import (CTI). Changes in domestic bank credit to the private sector (RPSC) are also expected to influence demand for foreign goods. With exception of the price variable, all variables are expected to affect import demand positively.

3.1.4 Export Demand

Like import prices, the price of a small open country's exports are determined in the world market. But, export demand is primarily determined by foreign (world) real income (Y_f). Thus:

$$EX = f(Yf, RER, EX_{t-1}) \quad (8)$$

Where world income may be represented by the income of major importing country(ies) for the country in question.

3.2 Aggregate Output and Prices

This block specifies the equations determining aggregate output and income along with capacity output and the domestic price level. It is assumed that in the short run output is determined as in the Keynesian model by the components of aggregate demand, but long-run capacity output is determined by a Neo-classical production function. This specification is meant to permit investigation of the short-run effects as well as the long-run effects of financial liberalisation on growth. While short-run output is Keynesian determined, we allow for short run supply constraints (such as the price of imported inputs, RER) to influence aggregate demand components such as investment. Furthermore, we derive a measure of capacity utilisation in terms of the ratio of real actual output to potential (trend) output. The measure of capacity utilisation may be included in the price equation to ensure dynamic interaction between short and long run factors in output determination. Real Gross Domestic Product (GDP) is therefore defined by commodity market's equilibrium as:

$$Y = PC + PI + G + EX - IM/P \qquad (9)$$

Where G is total government expenditure. All other variables are the same as defined earlier. The equilibrium condition in (9) can be stated in terms of equality between national saving (S) and investment (I), given net foreign capital inflow (FCI):

$I = S + Fc$, with[5] $S = Y - C$ and $FCI = IM - EX$.

Aggregate supply is determined by a simple Cobb-Douglas production technology in which real output relies positively on three inputs, labour supply (LF) and capital (both private, K_p and public, K_g), and technology, as represented by the trend variable (T):

$$Y_t = f(LF, K_p, K_g, T, Y_{t-1}) \qquad (10)$$

[5] Gross National Product (GNP) is Y^n = GDP + (NIA), where NIA is net income from abroad measured in local currency.

Changes in labour[6] supply are assumed to be exogenously-determined, and that LF grows at a constant rate. The real wage affects investment through adjustments in the level of employment. However, in view of data constraints, the nominal wage rate and the level of employment are assumed to be exogenous. As in equation 5 above the real wage rate (RWR) enters the investment function directly. RWR is the nominal wage rate divided by the price level. That is:

$$RWR = (NWR/P) \tag{11}$$

3.2.1 The Price Level

In this highly aggregated model only the domestic price level is defined as a function of the nominal interest rate, the expected price level (π_t) and predetermined and exogenous variables such as government expenditure. That is:

$$P_t = f(i_t, \pi_t, GDEF_t, P_{t-1}) \tag{12}$$

The current inflation rate is accordingly measured as the difference between current and past period price levels. The rate of interest is hypothesised to have an adverse impact on the price level, while all other regressors are expected to have positive effects.

3.3 Assets Market

The stock of money in the economy is the sum of total domestic credit to the private sector (PSC), total domestic credit to the public sector (DC_g), and the domestic currency value of foreign reserves ($ER.RES_t$), i.e.

$$M^s_t = DCG + PSC + ER.RES_t \tag{13}$$

As mentioned earlier money supply is broadly defined[7] as M_2, and RES is foreign exchange

[6] The relevant implicit labour demand is a function of the real wage rate and capacity utilization (CU), and equilibrium in the labour market is demand-determined.

[7] As argued in the previous section a more appropriate definition of liquidity would include M_2 plus the liabilities of NBFIs. Unfortunately, data on the later is available only for part of the period considered.

reserves. The stock of total domestic credit, DC, as in equation (14), is the sum of DCG and PSC, and as it is the case in many developing countries the latter is influenced by expansionary fiscal operations necessitating borrowing by the public sector from private sources as well as the Central Bank; public sector borrowing from external sources is assumed to be exogenous. Hence, total domestic credit flow is:

$$\Delta DC = \Delta DCG + \Delta PSC \qquad (14)$$

Equilibrium in the money market requires that the quantity of real money supplied be equal to the volume of real money balances demanded (M^d). Econometric estimation of money demand has become increasingly sophisticated. A more general specification of this function postulates that desired real money balances (M/P) is positively related to real (Y) and negatively related to the opportunity cost of holding money, given by the rate of return on alternative income-generating real or financial assets. According to Page (1993) the foregone return on real assets is usually measured by the expected rate of inflation (π), while the foregone yield on financial assets is measured by the relevant rate of interest (RDR). That is:

$$(M/P)^t = f(Y, \pi_t, RDR, (M/P)_{t-1}) \qquad (15)$$

The nominal rate of interest (i) function may be postulated in terms of the major factors influencing equilibrium in the goods market (i.e. Y and _Y), the stock of real money supply or total domestic credit, and foreign interest rates (i^*) adjusted for changes in the expected exchange rate (see Edward and Khan, 1985). That is in a general equilibrium setting the (ex-ante) nominal domestic rate of interest is specified as:

$$i_t = f(Y, \Delta Y, DC, [i^* + (ER^e_t - ER_t)/ER_t], i_{t-1}) \qquad (16)$$

With ER^e_t being the rate of exchange expected to prevail during the next period. The determination of the nominal exchange rate depends on the degree of financial control or deregulation and the sophistication of the domestic financial system. In particular the substitutability between domestic and foreign assets is paramount (see e.g. Aron and Ayogu 1995). It is very common in developing countries that individuals and firms maintain their bank

deposits in both local currency and US$. Accordingly, it is often postulated that exchange rate behaviour follows an interest parity condition[8].

However, we specify a rather more general nominal exchange rate function in which the current nominal exchange rate depends positively on past period exchange rate (ER_{t-1}), nominal interest rate and inflation:

$$ER_t = f(ER_{t-1}, i_{t-1}, \Delta P_{t-1}) \quad (17)$$

Assuming that expectations are adaptive, the expected real exchange rate (RER^e) can be defined as:

$$ERE^e = RER_{t-1} + \alpha_1(ER\text{-}RER_{t-1}) \quad (18)$$

The adjustment parameter α_1 will be equal to unity if expectations are fully realised. The real exchange rate (RER) is computed here as the ratio of foreign price level (Pf) to domestic price (P) times the nominal exchange rate (ER). That is:

$$RER = ER(Pf/P) \quad (19)$$

3.4 External accounts

3.4.1 Current account

$$CA_t = (P_t/ER)EX - (IM/ER_t) + i\,(F_{p,t-1} + F_{g,t-1} + RES_{t-1}) \quad (20)$$

Where the current account balance (CA) is defined in terms of foreign currency.

3.4.2 Balance of payments

$$\Delta RES_t = CA_t - \Delta F_{g,t} - \Delta F_{p,t} \quad (21)$$

[8] For example, Soludo (1995) uses this condition and assumes that the current exchange rate adjusts relative to expected exchange rate and default risk premium on foreign debt. This premium acts to equalise domestic and foreign interest rates. This yields: $ERt = \{(1+i^*/100)/(1+i^*/100)(1+DRP))\}ER^e$, where DRP is the default risk premium which depends on the product of actual to contractual interest payments on external debt and the ratio of external debt to exports.

3.5 The government sector

High public sector borrowing from the domestic banking sector stemming in particular from the need to finance budget deficits is closely associated with monetary expansion in many developing countries. Government expenditure level and government deficit to be financed from domestic sources, however, depend on government tax revenue, transfers from the central bank and the availability of foreign resources. The last two variables are exogenously-determined, while government real tax revenue (TR) may be modelled as a function of the real income, and the rate of inflation:

$$TR_t = f(Y, \Delta Pt, TR_{t-1}) \quad (22)$$

Real income, as a proxy for the tax base, is expected to have a positive coefficient, and inflation is included to test the hypothesis that real government revenue declines with price increases. Consequently government deficits increases with inflation, assuming that government expenditure is fixed in real terms. This deficit can now be defined as :

$$G_t - TR_t - OR_t = \Delta DC_{g,t} + \Delta BF_{g,t} \quad (23)$$

With OR representing other (non-tax) government revenue; _DCG = domestic credit to the public sector, including loans from the central bank; and $\_BF_g$ = net government borrowing from abroad.

3.6 Expectation formation

In view of paucity of information and adjustment difficulties (lags), expectations are assumed to be adaptive, i.e., in each period agents base their expectations on their present and past experiences. Accordingly, the standard Cagan's (1956) model may be used to obtain the expected rate of inflation in the current period as the difference between its actual current rate and past period's expected rate:

$$\pi_t = \Phi\Delta P_t + (1-\Phi)\pi_{t-1} \quad (24)$$

If expectations are fully realised, i.e. the adjustment parameter $\Phi=1$, then the actual and expected rates will be equal.

3.7 Model Closure

The model is essentially an extended IS-LM model, and carries much resemblance to the models estimated by Haque et. al (1990), Elbadawi and Schemit-Hebbel (1994) and Soludo (1995). The assumption of price flexibility ensures long-run equilibrium in all markets. Short-run output is Keynesian determined, whereas long-run output is determined by a neo-classical aggregate supply function. The model consists of ten behavioural equations for private consumption, private investment, real import and export, real output, demand for real money balances, the nominal rate of interest, the nominal exchange rate, the price level, and real tax revenue. Other endogenous variables include money supply, the expected inflation rate, the real wage rate, the real exchange rate, and the current account balance.

The model estimating equations and identities collapse into three equations determining price, interest rate and output; equilibrium in the goods market determines both real output and the price level, while equilibrium in the assets market determines the nominal rate of interest. For a given rate of inflation, the real rate of interest is computed as:

$$r = (1+i)/(1+\Delta P) \quad (25)$$

The model specifies two major links between the financial and expenditure sectors. First, the level of financial development as well as the real rate of interest are among the determinants of private saving and investment, thus any change in these variables may be translated into real sector effects. For instance, as standard economic theory suggests, any decrease in the real rate of interest would raise demand for money at the initial income level, and eventually enhance[9] aggregate demand and output. On the other side, any increase in aggregate demand due for

[9] Should the financial liberalisation hypothesis hold, a lower real interest rate would result in lower demand for real money balances as well as lower saving, investment and income.

example to expansionary fiscal policy may raise income resulting in higher demand for cash balances which may in turn push real interest rates upward assuming fixed money supply. This affects short-run aggregate demand and output, but, with resulting price increases and other changes, long-run output and income remain unchanged unless the arguments in equation (10) also change.

4. Model Estimation

4.1 Data sources and some estimation issues

For most developing countries, reliable data are only available for a relatively short period compared to developed economies, and on annual basis. Thus for the estimation of the specified model, annual data for the period 1966-1995 was employed. Updated (revised) Zimbabwe's data series were obtained from the Central Statistical Office, Institute of International Finance (1998) and published African Development Bank Data.

In estimating the behavioural equations, we allow for slow adjustment to regressors by testing the significance of lags of the dependent variables and of the explanatory variables. The econometric estimation proceeds as follows. First, to avoid the problem of spurious regression and ensure stationarity, unit root tests are used to determine the order of integration of each variable. Second, co-integration tests are employed to select the vectors of cointegrated series for regression. The standard Dickey-Fuller (DF) and the Augmented Dickey-Fuller (ADF) test statistics are computed by PCGIVE8 including a trend. For the purposes of the model, which will ultimately to be used for simulating for policy discussion, the two-stage least squares results from level regressions rather than error correction ones are presented and analysed in this section.

The estimation strategy followed the general to specific modelling procedure. For each behavioural equation we started estimation by running the model using all regressors as specified in the previous section. On the basis of various statistical tests (including stationarity, cointegration, F-ratio, R^2, σ, t-statistics and DW-statistics) parsimonious estimates were obtained. Only selected models were presented. For the two basic equations, private saving and

private investment, more than one selected results are presented, while for other equations only one result is reported and discussed.

4.2 Econometric Results

Table 3 reports the main results relating private investment to its main determinants in Zimbabwe. The fit of the model is quite good, yielding satisfactory R^2, F-test values and Durbin-Watson values. The results show that current income, measured by real per capita GDP growth has a positive impact on private saving, though the result is not always robust. The size of the coefficient is also small, suggesting that a one percentage increase in income growth would boost private saving by about 0.01 percentage points. Population growth, included to capture the impact of demographic factors, is negative, though not always significant. Studies on low-income countries have generally found demographic factors to have a limited impact on private saving (see Deaton, 1989). Changes in the terms of trade have a positive impact on private saving, though this is not significant.

Public saving was found to have a significant but negative impact on private saving, indicating the dominance of the crowding-out effects over the Ricardian equivalence hypothesis predictions. Morande and Schmidt-Hebbel (1991) estimated a consumption function for Zimbabwe and found a similar result of a direct crowding-out effect of private saving by public saving.

Among the liquidity constraints variables, domestic credit was found to have a positive, but not significant coefficient, while the broad money ratio (representing wealth effects) was found to have a positive and significant impact on private savings. The real interest rate had a positive but not significant impact, suggesting that private saving appears to have responded slowly to the liberalisation of the interest rates.

The effects of macroeconomic uncertainty on private savings, as measured by inflation rate and the three-year moving standard deviation of inflation is negative and significant at the 5% level. Highly variable inflation rates have depressive effect on private saving since they blur information about future returns on savings. The effect of inflation is also negative and

significant, suggesting that inflationary policies are harmful to private investment growth.

Overall, the results from the saving function suggest that an overwhelming dominance of income, public saving, wealth, and uncertainty variables, while the interest rate and domestic credit appear to have a minimal impact.

The private investment function includes neo-classical, liquidity constraints and Keynesian variables and risk and uncertainty determinants. The results that are reported in Table 4 are consistent with earlier results in Mlambo and Mhlope (1997) and Morande and Schmidt-Hebbel (1991). The results show that income growth has a positive impact on private investment, though this is not a robust result. The user cost of capital (UCK) has a strong negative impact on private investment. A percentage increase in the cost of capital would decrease private investment by between 0.001 and 0.009. Real domestic credit showed a positive and significant impact, indicating that when the private sector is squeezed for credit, they will tend to reduce the level of private investment. The size of the coefficient is large, ranging between 0.3 and 0.5.

The estimation results provide weak support for substitutability between private and public investment. The public investment variable is negative, indicating the crowding-out effect. This result is different from earlier results of Morande and Schmidt-Hebbel (1991) who, using the public capital variable in the estimation found complementarity between government and private investment. Given that government financed its spending out borrowing in the domestic markets, the finding of the dominance of crowding-out effects appears reasonable. The real wage variable was found to have a statistically significant, though surprisingly positive co-efficient. This may reflect the fact that the average real wage rate (which is dominated by that of unskilled labour) has been declining since the 1980s. terms of trade have a positive and strongly significant impact on private investment, while the real exchange rate is negative and significant.

The effects of macroeconomic uncertainty, measured by standard deviations of inflation (INFSD), real exchange rate (RERSD), and terms of trade (TOTSD) have the expected negative signs and are statistically significant. Highly variable inflation and exchange rate, which are indicators of uncertainty, have a depressive impact on private investment.

Import and export functions generally yield expected results. In the import function, real GDP had no significant impact on import demand, while the effect of the real exchange rate was negative and significant. The capacity to import variable was found to be positive, and the size of the co-efficient was large. In the export demand equation, foreign income has low significance, though positively signed, while the real exchange rate for exports was highly significant, and suggested that a devaluation of the exchange rate would boost import demand.

Regarding the aggregate output equation, capital and technology were found to be statistically significant and correctly signed, while labour was not significantly different from zero. In the estimation, there was an attempt to decompose capital into private and public capital stock, but the results were unsatisfactory.

The equation for the price level includes the nominal interest rate, expected inflation and fiscal deficit as independent variables. Expected inflation, nominal interest rates and fiscal deficit are statistically significant and correctly signed. The results also show very strong inertial effects as evidenced by the large and statistically significant co-efficient of lagged price level.

In the money demand equation, all the variables have the expected signs. The real income level is positive and significant at the 5% level, and has a relatively large coefficient. The estimation results also show that the real interest rate had a negative impact on money demand, but expected inflation, though correctly signed, was found to be insignificant. In the interest rate equation, all the variables, with the exception of real income, had the expected signs. However, total domestic credit was found to be insignificant, while the foreign interest rate effects showed low significance levels. For the nominal exchange rate equation, real income is correctly signed but not significant, while inflation is positive and significant at the 10% level.

Two variables are included in the tax revenue function: real income and inflation. The real income variable, which can be taken to proxy the tax base has a large, positive and significant co-efficient. Although we had expected inflation to show a negative impact on tax revenue, the estimation results in Table - show that it has a positive and significant impact. This may reflect that the tax system in Zimbabwe is generally progressive.

5. Conclusions and policy implications

In this paper we developed and estimated a macroeconomic behavioural model for the Zimbabwean economy. The model, which is essentially an extended IS-LM, gives a number of interesting policy conclusions. Also, most of the coefficients have the signs expected *apriori*, and are significantly different from zero.

The first policy question relates to the role of financial policy in Zimbabwe. The savings equation shows that the real interest rate does not have a significant impact, while the broad money, which proxies the wealth effect had a positive and significant impact on domestic saving. From a policy perspective, this suggests that the scope for increasing savings by raising the deposit rate may be limited, while an increase in wealth would boost domestic saving. It is also important to note that the size of the wealth coefficient is large, indicating its potency as a device for raising domestic saving.

In the case of private investment equation, both the user cost of capital and domestic credit exert a substantial influence. The real interest, which forms a major component in the measurement of the user cost of capital, therefore plays an important allocative role in the Zimbabwean economy. The financial policy variables used in this paper are also indicative of the state of financial conditions. If the real interest rates are negative over long periods, and if real wealth is falling, then the financial conditions are likely to be inimical to domestic resource mobilisation.

The real interest rate was also found to have a negative and significant impact on money demand. From a policy perspective, this result indicates the importance of maintaining the real deposit rate of interest positive. A fall in the real deposit rate would reduce the real demand for money, which would cause the real size of the banking system to contract, and therefore squeeze credit availability.

However, the results from the saving equation suggest that interest rate liberalisation on its own would not produce the required result. The supply of credit will play an important role in improving the conditions for mobilising domestic resources. In the short run, and in the

absence of international mobility of capital, the supply of real domestic credit can be increased through real monetary growth, which can be effected through an increase in the real deposit rate. Thus, to improve overall economic performance, Zimbabwe will need to deepen comprehensive economic reforms, improve monetary and financial policy instruments, and strengthen the financial system.

The second policy issue relates to the role of the macroeconomic environment on savings and investment. The study found that overall macroeconomic uncertainty had a negative and significant impact on savings and private investment. Inflation is an important indicator of macroeconomic uncertainty, and our results point to the need to take actions to reduce the rate of inflation and its variability. Part of the reason for the difficulty of reducing inflation in Zimbabwe is related to the increased role of the price mechanism in the allocation of resources. During the early stages of the reform programme, the upward adjustment of relative prices, particularly in the case of prices of public utilities such as electricity and telecommunication, and removal of prices fed into the inflationary process. Over time, however, the size of the fiscal deficit has been a key obstacle to reducing inflation. The results of the model showed that fiscal deficit contributed to increases in the price level.

The results also show the significance of relative prices in influencing international trade. This highlights the importance of the exchange rate policy in the adjustment process. The real exchange rate was found to be significant in both the export and import equations, indicating the need to increase the external competitiveness of the economy. Moreover, the real exchange rate also impacts on private investment.

Overall, the study concludes that financial policy plays a very important role in overall economic performance in Zimbabwe, and calls for a deepening of the reforms and greater macroeconomic stability.

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Appendix 1: List of variables

M2 = Broad money
QM = Quasi money
NBFIL = Liabilities of non-bank financial intermediaries
NBFIA = Assets of non-bank financial intermediaries
DMBDA = deposit money banks' domestic assets
CBDA = Central Bank's domestic assets
PSC = domestic credit to the private sector
DCG = domestic credit to the public sector
DC = total domestic credit
DR = i = nominal deposit rate of interest
LR = lending rate of interest
BR = Bank/Discount rate
GDP= real Gross Domestic Product
PC = private consumption expenditure
POP = total population
DEPEND = dependency ratio
PCAPy = per capita income
PCAPySQ = per capita income square
TOT = terms of trade
GC = government consumption expenditure
TAX = real tax revenue
GS = Budget deficit
P = CPI = Consumer price Index (1990=100)
CA = current account deficit
ER = nominal exchange rate
RER = real exchange rate
Yd = disposable income
i* = foreign rate of interest (US)
Pf = foreign price level (1990=100)
Yf = World income
Y = real output
Kg = government capital stock
Kp = private sector capital stock
GI = public investment
PI = private investment
Pi = investment goods price index (1990=100)
UCK = user cost of capital
δ = DEPR = depreciation rate (assumed 5%)
GDPDEF = GDP deflator (1990=100)
LDEBT = long term debt of the public sector
IM = value of imports in domestic currency
RES = foreign currency reserves excluding gold
EX = domestic currency value of exports
Pm = import price index (1990=100)
Px = export price index (1990=100)

NIA = net income from abroad
LF = Labour supply
T = technology
NWR = nominal wage rate
π = expected inflation rate
INFL = $\dot{P}$ = inflation rate
Md = money demand
Fp = foreign currency assets of the private sector
Fg = foreign currency assets of the public sector
OR = non-tax government revenue
NBF = net government borrowing from abroad per annum.

Endogenous variables: GDP, PC, PI, i, YD, MD, IM, EX, TR, CPI, ER, RWR, RER